

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
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1. REPORT DATE (DD-MM-YYYY) 07-14-2015		2. REPORT TYPE FINAL		3. DATES COVERED (From - To)	
4. TITLE AND SUBTITLE Pirates of the Nuclear Age: The Role of U.S. Submarines in Modern Trade Warfare				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) LCDR Clint J. Christofk (USN) Paper Advisor: CAPT F. W. Mosenfelder (USN)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Joint Military Operations Department Naval War College 686 Cushing Road Newport, RI 02841-1207				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT For Example: Distribution Statement A: Approved for public release; Distribution is unlimited. Reference: DOD Directive 5230.24					
13. SUPPLEMENTARY NOTES A paper submitted to the Naval War College faculty in partial satisfaction of the requirements of the Joint Military Operations Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.					
14. ABSTRACT Pirates of the Nuclear Age: The Role of U.S. Submarines in Modern Trade Warfare. Many contemporary naval theorists contend that submarines will never again be used to attack an adversary's maritime trade. This paper analyzes applicability of offensive trade warfare using submarines to determine if this remains an important mission for the U.S. Navy. The paper investigates The People's Republic of China as a potential adversary and discusses critical requirements and vulnerabilities present in Chinese imports that could be exploited by the U.S. in the event of a conflict. The paper discusses the roles that U.S. submarines could play in exploiting these vulnerabilities with a focus on the asymmetric nature of the submarine. Finally, the paper draws conclusions about trade warfare as an enduring nature of war at sea and identifies factors that could potentially upset a U.S. advantage in maritime trade warfare.					
15. SUBJECT TERMS China, PRC, Trade Warfare, Submarines, Chokepoints, Sea Lines of Communication, Oil, Tanker Wars, South China Sea, Strait of Malacca					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES 24	19a. NAME OF RESPONSIBLE PERSON Chairman, JMO Dept
a. REPORT UNCLASSIFIED	b. ABSTRACT UNCLASSIFIED	c. THIS PAGE UNCLASSIFIED			19b. TELEPHONE NUMBER (include area code) 401-841-3556

**NAVAL WAR COLLEGE
Newport, R.I.**

**Pirates of the Nuclear Age
The Role of U.S. Submarines in Modern Trade Warfare**

by

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Lieutenant Commander, USN

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: _____

14 July 2016

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Paper Abstract

Pirates of the Nuclear Age: The Role of U.S. Submarines in Modern Trade Warfare.

Many contemporary naval theorists contend that submarines will never again be used to attack an adversary's maritime trade. This paper analyzes applicability of offensive trade warfare using submarines to determine if this remains an important mission for the U.S. Navy. The paper investigates The People's Republic of China as a potential adversary and discusses critical requirements and vulnerabilities present in Chinese imports that could be exploited by the U.S. in the event of a conflict. The paper discusses the roles that U.S. submarines could play in exploiting these vulnerabilities with a focus on the asymmetric nature of the submarine. Finally, the paper draws conclusions about trade warfare as an enduring nature of war at sea and identifies factors that could potentially upset a U.S. advantage in maritime trade warfare.

Introduction: Maritime Trade Warfare as an Enduring Nature of Conflict

Since the beginning of armed conflict at sea, states have sought to influence the outcome of the conflict by targeting enemy commerce. This influence historically called for the use of privateers, state-sanctioned pirates, to seize enemy merchantman. This impacted the adversary's war fighting capabilities and the civilian population. These efforts helped achieve a more favorable negotiated peace. In the late nineteenth and early twentieth century, and particularly during World War One (WWI), submarines took the position of privateers as the ideal force for conducting commerce warfare. Throughout World War Two (WWII) commerce warfare using submarines continued to have a notable impact.¹ Despite its successes in these two major wars, many contemporary naval theorists contest that submarines will never again directly attack enemy merchant shipping. Globalization, they contend, has caused such deep connections between all participants in the modern global economy that a modern state could not attack enemy shipping without causing significant harm to its own economy.² This line of reasoning dismisses the enduring nature of war, and can be dangerous in that it runs the risk of failing to fully exploit the lessons of the past. General Omar Bradley predicted while testifying to Congress in October 1949 that "large-scale amphibious operations . . . will never occur again."³ Less than a year later, on 15 September 1950, General McArthur conducted an amphibious landing involving 230 ships and a Marine division at Inchon Korea.⁴ The point is not that Bradley was wrong, but rather that he fell victim to a common way of thinking: the next war will be different than the last.

¹ Michael T. Poirer, "Results of the German and American Submarine Campaigns of World War II," (U.S. Navy, Office of the Chief of Naval Operations, Submarine Warfare Division, 1999).

² Geoffrey Till, "A Changing Focus for the Protection of Shipping," in *The Strategic Importance of Seaborne Trade And Shipping: A Common Interest of Asia Pacific*, ed. by A Forbes (Canberra: Royal Australian Sea Power Center, 2002), 14.

³ Ronald H Carpenter, *Rhetoric in Martial Deliberations and Decision Making: Cases and Consequences* (Columbia, SC: University of South Carolina Press, 2004) 22.

⁴ Richard Natkiel and Anthony Preston, *Atlas of Maritime History* (New York: Facts on File, 1986) 233.

While it is true that tactics and technologies change, the fundamental nature of war (like the value of attacking an adversary's commerce) remains. From the time of Greek city-states, to the privateers of the age of sail, to the submarines of WWI and WWII, targeting the adversary by attacking shipping has remained a key line of effort in countless conflicts. It is dangerous to dismiss a way of warfare that has worked for thousands of years as obsolete regardless of the reasoning. The U.S. submarine campaign during WWII inflicted heavy losses on the Japanese with relatively low monetary cost,⁵ and had a significant impact on the overall conflict. Certainly, though, the world has changed since WWII. The geopolitical and economic circumstances of likely near-peer competitors today are vastly different than that of Imperial Japan. Therefore investigating a modern example as well as considering historical successes will determine if trade warfare is a viable mission for the U.S. Navy today. As one of the few potential near-peer competitors in the contemporary world, the People's Republic of China (PRC)⁶ serves here as the adversary to model the feasibility of trade warfare. Analysis reveals that maritime trade warfare using submarines would be extremely effective for the U.S. in a conflict with China.

China's Lifeblood: Is China Dependent on Foreign Oil?

Examination of the Chinese economy shows that it depended on maritime trade. Specifically the oil sector of the Chinese energy economy could be a possible target for attack by an adversary. Other sectors of the economy could be targeted as well, but oil is specifically of interest in order to bound the scope of the examination. Also, since oil literally "fuels" the war fighting machinery of modern forces, it is critical requirement that could be

⁵ Poirer, "Results of Submarine Campaigns."

⁶ "PRC" and "China" are used interchangeably to refer to the People's Republic of China.

potentially impacted. Since 1993, China has been a net oil importer ⁷ importing 6.2 million barrels per day (BPD) in 2014. ⁸ One estimate noted that in 2011, oil reserves in the PRC were only enough for 50 days of consumption. ⁹ This means that in a conflict where Chinese oil imports were reduced or cut, normal consumption rates would need to be reduced immediately. Even with cuts the economy and military could be starved for oil in a relatively short time. Vulnerability in oil resources is understood in China. A case study on risks associated with oil supply chain supported by a grant from the National Natural Science Foundation of China points out that “overall, the outlook for China’s oil import security is not optimistic” and that PRC should “reduce the dependence on external oil resources to reduce oil import risks fundamentally.” ¹⁰ Chinese oil supply seems vulnerable to the outside observer, and China sees this risk as well and is taking steps to limit this vulnerability. Reducing dependence on imported oil is certainly a reason that China lays claim to much of the South China Sea and the suspected 11 billion barrels of oil available in the area. ¹¹ Furthermore, they are taking steps to build artificial islands out of rocks, ¹² enabling claims (even if weak claims) to an oil-rich 200 nautical mile exclusive economic zones from the new islands. ¹³

At the operational level of war, the Chinese center of gravity (COG) in nearly any conceivable conflict would be some sort of naval or ground-based unit that would require

⁷ Hai-Ying Zhang, Qiang Ji, and Ying Fan, “An Evaluation Framework For Oil Import Security Based on the Supply Chain With a Case Study Focused on China,” *Energy Economics* 38 (2013): 91.

⁸ U.S. Energy Information Administration, *China: International Energy Data and Analysis*, accessed 27 April 2016, <http://www.eia.gov/beta/international/analysis.cfm?iso=CHN>.

⁹ Milan Vego, “Chinese Shipping Could be Risky Business,” *U.S. Naval Institute Proceedings* Vol 140 Issue 4 (April 2014): 38.

¹⁰ Zhang, Ji, and Fan, “Oil Import Security,” 94.

¹¹ Council on Foreign Relations, Territorial Disputes in the South China Sea, last modified May 10, 2016 <http://www.cfr.org/global/global-conflict-tracker/p32137#!/conflict/territorial-disputes-in-the-south-china-sea>.

¹² Ibid.

¹³ U.S. Department of the Navy, *Naval Warfare Publication 1-14M, The Commander’s Handbook on the Law of Naval Operations* (July, 2007), 1-7.

fuel in order to conduct operations. As such fuel would be a critical requirement and vulnerability to enable the COG. Therefore targeting oil imports would demonstrate an indirect approach by the U.S. to target the COG via the operational functions of sustainment and movement and maneuver. Certainly based on the size of China, measures are available to their military to reduce oil consumption in certain sectors to allow critical military operations to continue. However such measures, while they may allow the Chinese units to continue the fight, would almost certainly make economic and domestic political costs very high for the PRC. This is likely to limit the amount of time the military could afford to continue in a conflict.

Since it is clear that China is dependent on oil imports to fuel its economy and military, it is important to determine what portion of the oil import supply chain is vulnerable and could be exploited by a potential adversary.

China as a Continental Island: Are Chinese Oil Imports Vulnerable?

Comparing historical trade warfare successes to the case of the PRC could be difficult. Submarine campaigns aimed to starve the United Kingdom and Japan by the Germans and the U.S. respectively during WWII differ from the PRC example in that both target states in WWII were island nations. PRC is anything but an island. Covering nearly 9.6 million square miles, it is the fourth largest state in the world.¹⁴ However, when considering the specific metric of oil imports, China resembles a large continental island and shares characteristics with the UK and Japan during WWII. China imports over 50% of its oil from the Middle East and almost 25% from Africa.¹⁵ 90% of imported oil arrives by sea¹⁶ and

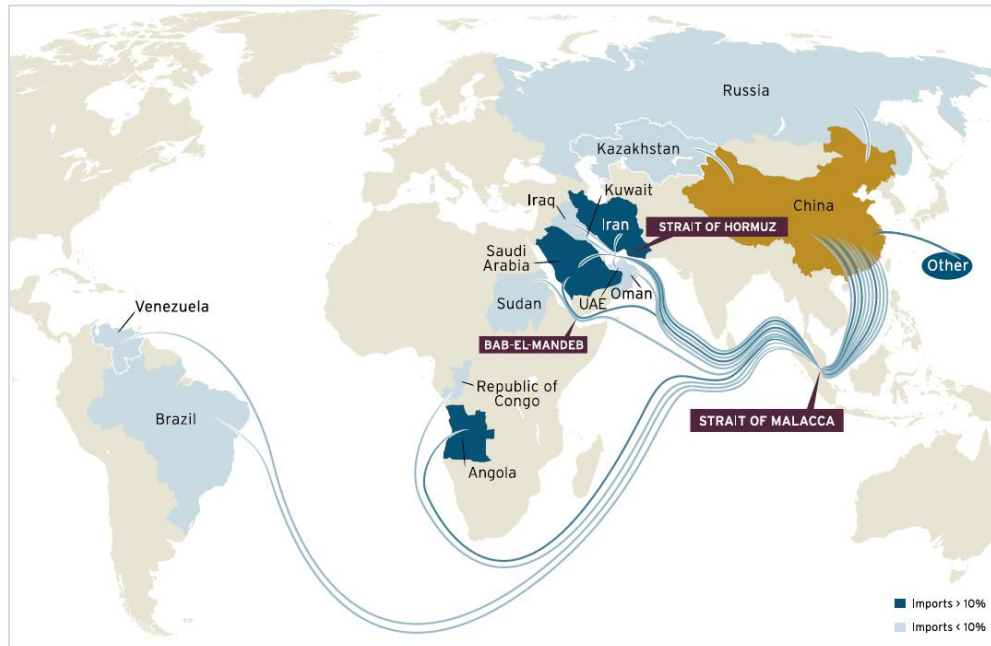
¹⁴ U.S. Central Intelligence Agency, *The World Factbook: China*, accessed 27 April 2016, <https://www.cia.gov/library/publications/the-world-factbook/geos/ch.html>.

¹⁵ U.S. Energy Information Administration, *China*.

¹⁶ Zhang, Ji, and Fan, "Oil Import Security," 89.

80% is carried through the Strait of Malacca.¹⁷ Figure I, created using U.S. Environmental Information Agency (EIA) data, shows sources and transit routes of Chinese oil imports.¹⁸ Looking at Figure I, a practitioner of operational art could identify the Strait of Malacca as a decisive point in any conflict against China if impacting oil imports was an objective.

Figure I



Created by Marcia Underwood

Avoiding the Strait of Malacca takes a minimum of 3 days to transit south through the Lombok Strait.¹⁹ Utilizing this route would just serve to move the flow of oil from one vulnerable chokepoint to another just as vulnerable. The additional 3 day voyage would cost \$200,000 to \$300,000 (USD) per trip,²⁰ which might not be cost-prohibitive, but would be a real cost. Transiting south of Australia and thereby avoiding the Malacca and Indonesian

¹⁷ U.S. Energy Information Administration, *China*.

¹⁸ Marcia Underwood, *Oil Maps: China Import Countries*, 2011, accessed 6 May 2016. <http://marciaunderwood.com/FreshWP/portfolio/oil-maps/>.

¹⁹ Peter J Rimmer, "Commercial Shipping Patterns in the Asia-Pacific Region, 1990-2000: The Rise and Rise of China," in *The Strategic Importance of Seaborne Trade And Shipping: A Common Interest of Asia Pacific*, edited by A Forbes (Canberra: Royal Australian Sea Power Center, 2002), 39.

²⁰ Ibid.

chokepoints adds 14 days to the transit ²¹ and cost \$900,000 to \$1.4 million (USD). Some economists have claimed that even this longer transit, while it would increase the cost of transport, would not actually translate to increased fuel prices in China. ²² While it may be true that consumers would not feel this cost, it would still have an impact on the actual amount of oil that could be imported by China. The largest tankers can carry approximately 2 million barrels of oil. ²³ Taking a simplistic model for oil shipping in which tankers only serve the Middle East and Africa to China route, and taking the conservative assumption that only the largest tankers in the world serve this route, the added transit time would require a minimum of an additional 44 tankers to maintain oil imports:

$$\frac{6.2 \text{ million BPD (imports in 2014)}^{24} \times 14 \text{ days (extra transit time)}^{25}}{2 \text{ million barrels (per ship)}}^{26}$$

The global fleet of supertankers exceeds 600 vessels, ²⁷ so the global fleet could likely absorb the demand of 44 additional tankers serving China. However, this shift in the global distribution of supertankers would not be quick. It is also likely in the event of a conflict that many tankers would not serve this route due to flag-state or owner interests. With 10% of Chinese energy imports carried aboard Chinese flagged ships, ²⁸ China would likely be able to compel these ships to continue sailing despite the risks, but the other 90% would be at the will of the global economy, owners, and flag-state direction. If the Strait of Malacca or other chokepoint were compromised for oil imports, China would feel the

²¹ Ibid.

²² Ibid.

²³ American Petroleum Institute, *Tankers: Fueling American Life* (Washington, DC: API Digital Media, 2011).

²⁴ U.S. Energy Information Administration, *China*.

²⁵ Rimmer, "Commercial Shipping Patterns," 39.

²⁶ American Petroleum Institute, *Tankers: Fueling American Life*.

²⁷ Tomas Kristiansen, "Maersk Tankers CEO: 70 VLCCs Too Many." *Shippingwatch*, May 3, 2013, <http://shippingwatch.com/articles/article5232704.ece>.

²⁸ Gabriel B. Collins and William S. Murray, "No Oil for the Lamps of China?," *Naval War College Review* 61.2 (Spring 2008): 84.

impacts almost immediately. With only 50 days of oil reserves,²⁹ there would not be time for alternative routes, additional tankers, or a surge in Chinese production of tankers to come to bear before the economy and military were desperate for oil. This would likely drive the conflict to a negotiated resolution on U.S. terms.

The Chinese understand their limited ability to protect their vital SLOCs and are taking actions to secure them by expanding naval power, building pipelines, and securing overseas holdings for basing. Chokepoints are a specific challenge for the Chinese to defend due to the distance of the chokepoints from existing bases.³⁰ Gabriel Collins and William Murray contest that “an energy blockade of China could be initiated at such choke points as the Malacca and Hormuz straits, both of which lie far from the Chinese coast.”³¹ They further speculate that such a blockade “might be very attractive to civilian policy makers and military planners preparing for a conflict with China . . . [since] such a course might achieve political objectives with very low levels of violence.”³² Distance, coupled with limited numbers of resupply vessels would force the People’s Liberation Army Navy (PLAN) to operate far from home with limited sustainment capabilities in order to protect SLOC chokepoints. Chinese analysts are concerned with this vulnerability and are making efforts to extend their defensive capabilities far from home by developing aircraft carriers.³³ Chinese analysts suggest that the PRC should develop overseas bases in order to support their naval forces in an effort to defend SLOCs.³⁴ This so-called “String of Pearls”³⁵ around the Indian

²⁹ Vego, “Risky Business,” 38.

³⁰ Collins and Murray, “No Oil,” 81.

³¹ Ibid.

³² Ibid.

³³ Michael S. Chase, et al., *China’s Incomplete Military Transformation: Assessing the Weaknesses of the People’s Liberation Army (PLA)*, (Santa Monica, CA: RAND Corporation, 2015), 92-93.

³⁴ Ibid.

Ocean would shorten the lines of supply for naval forces defending SLOCs and mitigate the small number of PLAN replenish ships and the distance of chokepoints from China.³⁶

China is also taking steps to literally change its geographic situation with respect to its oil SLOCs. Donna J. Ninic describes SLOCs and associated chokepoints as “scarce resources,”³⁷ explaining that seaborne trade routes have remained relatively the same for hundreds of years. Trade routes shift only at great cost such as the building of the Suez and Panama Canals which Ninic proposes “are not likely to be replicated in the future.”³⁸ China, however, may be seeking to do just this by considering such enormous projects as a \$20 billion (USD) canal through Kra Isthmus in Thailand to bypass the Strait of Malacca.³⁹ Oil pipelines are an even more cost-effective way to counter the vulnerability of SLOC chokepoints. The U.S. Energy Information Administration notes that “China is improving its domestic oil pipeline network to integrate its oil supply and demand centers and to diversify its oil import sources through pipeline links with Kazakhstan, Russia, and Myanmar.”⁴⁰ Current oil pipelines can carry roughly 1.1 million BPD⁴¹ (17% of average daily imports) through routes that avoid the Strait of Malacca. This number is projected to increase to 1.4 million BPD (22% of daily imports)⁴² in 2016 with the expansion of a Russia-China

³⁵ Jeremy Bender and Armin Rosen, “This Pentagon Map Shows What's Really Driving China's Military and Diplomatic Strategy,” *Business Insider*, May 13, 2013, <http://www.businessinsider.com/this-map-shows-chinas-global-energy-ties-2015-5>.

³⁶ Chase, et al., *Incomplete Transformation*, 92-93.

³⁷ Donna J. Ninic, “Sea Lane Security and U.S. Maritime Trade: Chokepoints as Scarce Resources,” in *Globalization and Maritime Power*, ed. Sam J. Tangredi (Honolulu: University Press of the Pacific, 2002), 146.

³⁸ *Ibid.*, 147.

³⁹ Corey Rhoden, “Easing the Malacca Energy Bottleneck: Is it Time for the Kra Canal?,” *Forbes*, June 29, 2015, <http://www.forbes.com/sites/drillinginfo/2015/06/29/kra-canal/#4c0e2a6e777b>; Tim Maverick, “A Thai Canal to Be Part of China’s Silk Road,” *Wall Street Daily*, January 27, 2016, <http://www.wallstreetdaily.com/2016/01/27/thailand-kra-canal-china-silk-road/>.

⁴⁰ U.S. Energy Information Administration, *China*.

⁴¹ Jeremy Bender and Armin Rosen, “Pentagon Map.”

⁴² These percentages determined using 2014 crude oil imports for PRC (from U.S. Energy Information Agency) and 2016 (and future projected) pipeline capacities. Some estimates have much higher crude oil imports for

pipeline. This does not mean that the Strait of Malacca and associated SLOCs are not still critical to Chinese oil imports. But it does show that China is taking steps to effectively change their geographic situation and possibly, with time, eliminate the Strait of Malacca as a critical vulnerability.

Submarines as Asymmetric Modern Pirates: Are Submarines Right for the Task?

Thus far it is established that the PRC is dependent on oil imports to fuel its economy and military, and that PRC oil imports are vulnerable to targeting of SLOCs and chokepoints. What remains is to investigate the role of U.S. submarines in this targeting and to determine if it is the best-suited platform. Like privateers before them, submarines are the asymmetric tools of trade warfare today. Submarines possess the strengths of asymmetry and stealth that make them particularly well-suited for offensive trade warfare.

Submarines are inherently asymmetric as they can inflict a large amount of destruction with relatively low cost and risk. Submarines embody the principle of economy of force. Michel Poirier conducted an analysis of the U.S. submarine campaign during WWII and established by mathematical modeling that the “Japanese spent at least 42 times more in Anti-Submarine Warfare and in losses attributed to submarines than the U.S. spent on her Submarine Force.”⁴³ Poirier includes the cost of Japanese merchants and cargo lost as well as the cost of the fleet used to protect shipping. He compares this to the costs to build U.S. submarines.⁴⁴ While it is certain that today’s nuclear-powered submarines are more expensive to build than WWII submarines, it can be safely assumed that based on size and complexity, the cost of oil tankers and their cargo has risen just as much. Based on their

PRC in 2016 than in 2014, which would make pipeline capacity as a percentage of total imports much less. 2014 imports are used here as they are the most recent values established by the U.S. Government.

⁴³ Poirier, “Results of Submarine Campaigns.”

⁴⁴ Ibid.

destructive capabilities and (relatively) low cost, U.S. submarines remain a formidable asymmetric threat.

Submarines could also play an asymmetric role in trade warfare through deterrence. Unlike in the event of a surface blockade, where all tankers would need to be boarded, searched, and diverted, a submarine might be able to attack only a small number of vessels to have a large deterrent effect on the remainder of the would-be transporters of oil. During the Falklands conflict, once the Royal Navy Submarine, the HMS CONQUEROR, sank the Argentine cruiser, the ARA GENERAL BELGRANO, the remainder of the Argentine Navy returned to port and was essentially no longer a factor in the conflict.⁴⁵ This shows that since they are unseen, even the threat of a submarine operating along a PRC SLOC could have a deterrent effect on shipping. Submarines can have an exponentially large role in a conflict disproportionate to their small numbers.

A further asymmetric deterrent for shipping oil to the PRC during a conflict would come in the form of rising insurance rates. There are no modern examples of merchant shipping being attacked by submarines where the associated insurance premiums can be analyzed for trends. However, a parallel is available in viewing insurance rate increases associated with modern piracy. There are several types of insurance carried by shipping companies. War Risk insurance covers vessels transiting specific risk areas as defined by insurance companies. In reaction to the threat of Somali pirates in May 2008, Lloyds declared the Gulf of Aden as a war risk area. Insurance premiums went up 300 fold as a result.⁴⁶ Combined with other types of insurance increases (for kidnap and ransom, hull, and cargo) overall cost spent in insurance premiums rose by as much as \$3.2 billion as a direct

⁴⁵ *Encyclopedia Britannica*, s.v. "Falklands Island War," accessed May 11, 2016, <http://www.britannica.com/event/Falkland-Islands-War>.

⁴⁶ Anna Bowden, "The Economic Costs of Maritime Piracy" (Oceans Beyond Piracy, 2010), 10.

result of piracy.⁴⁷ Rather than pay increased insurance rates and risk piracy attacks, many shipping companies chose instead to re-route their vessels South of Africa to avoid the Gulf of Aden.⁴⁸ In the case of China, rerouting of tankers south of Australia to avoid chokepoints, as already shown, would have a detrimental impact on Chinese oil imports.

Another clear advantage that U.S. submarines would have in attacking tankers transporting oil to China is that the Chinese are currently not proficient at Anti-Submarine Warfare (ASW). *China's Incomplete Military Transformation*, a study by the RAND Corporation National Security Research Division notes that a "limitation the PLAN faces in its operations, particularly those away from coastal waters, is its lack of an ASW capability."⁴⁹ The study further states that the PLAN previously focused on anti-access operations, but is now expanding its expeditionary role. This role will make developing ASW capabilities more important.⁵⁰ The advantage that the U.S. currently has in submarine capabilities related to PLAN ASW capabilities may not exist forever.

Gabriel Collins and William Murray discuss reasons that a distant or close blockade would likely fail to cut Chinese oil imports in *No Oil for the Lamps of China?* Among the significant reasons that they cite are Chinese anti-access capabilities to counter a close blockade and the inherent porousness and tactical problems of trying to board and divert ships in an area as busy as the Strait of Malacca.⁵¹ Using submarines not to board and inspect, but actually attack and destroy defeats these concerns with establishing a blockade. Submarines are nearly immune to anti-access measures, and the PLAN does not have sufficient ASW capabilities to counter a U.S. submarine campaign at this time. Attacking

⁴⁷ Ibid., 25.

⁴⁸ Ibid., 12-13.

⁴⁹ Chase, et al., *Incomplete Transformation*, 93.

⁵⁰ Ibid.

⁵¹ Collins and Murray, "No Oil," 92.

could be more costly politically than blockading via boarding and inspecting, but this political cost could probably be offset by announcements of a war zone or maritime exclusion zone as was utilized by the United Kingdom in the Falklands conflict of 1982.⁵²

There are other methods that the U.S. could utilize to target Chinese oil imports. These include kinetic attacks on oil pipelines, port infrastructure, refineries, and domestic oil fields as well as cyber-attacks on port operations nodes. All of these methods, with the possible exception of cyber-attacks, would likely incur more risk to U.S. forces as well as cause more escalation than attacking tankers using submarines. While these other methods could still be considered and included in an overall campaign, the operational advantage and asymmetric value of utilizing attacks from submarines would likely cause policymakers and planners to principally employ submarines in this role.

Challenges of Attacking Shipping: Lawyers, Oil Spills, and Globalization

Arguments abound as to why the U.S. would never again undertake to destroy enemy shipping. These arguments typically fall into environmental, legal, and economic areas. The largest oil spill in history into the maritime environment was during the Gulf War in 1991 and is estimated at 6-8 million barrels.⁵³ China imports 6.2 million barrels of oil every day.⁵⁴ Of this 90% is transported by sea.⁵⁵ If every tanker were attacked and all oil was completely spilled into the environment, 5.6 million barrels (or the equivalent of nearly one Gulf War) would spill every day. These numbers are staggering, and present a significant reason why it might be extremely politically costly to directly attack oil tankers (with submarines or by any other method). However as discussed, based on the asymmetric aspects of the submarine and

⁵² *Encyclopedia Britannica*, s.v. "Falklands Island War."

⁵³ A. G. R. Price, "Impact of the 1991 Gulf War on the Coastal Environment and Ecosystems: Current Status and Future Prospects," *Environmental International* 24, no. 1/2 (1998): 91.

⁵⁴ U.S. Energy Information Administration, *China*.

⁵⁵ Zhang, Ji, and Fan, "Oil Import Security," 89.

the likely deterrence that would result in just a few attacks, it is very likely that only a few ships would actually be attacked (the largest of which can carry 2 million barrels).⁵⁶ Of these, it is possible that not all oil would spill out of the ship. These estimates are difficult to quantify, but it is sufficient to say that not all China-bound oil would be spilled. The actual amount spilled would be considerably less than the unrealistic worst case presented here. Also of significance is the environmental impact of the worst oil spill in history. One study conducted in 1996 (five years after the spill) noted that “pollution in the Gulf was restricted to approximately 400 km from the sources” and that “levels of contamination at impacted sites were generally shown to have decreased by approximately 50% between 1991 and 1992.”⁵⁷ The study concluded that “the coasts of Saudi Arabia and Kuwait which were contaminated by oil during the 1991 Gulf War are recovering.”⁵⁸ So perhaps the environmental costs, while high, are not as significant as they seem at face value, and perhaps other factors make the environmental costs more palatable. What is almost certainly true is that U.S. domestic audiences would prefer to see news stories about oil spills thousands of miles from our coasts than to see reports of American husbands, fathers, and community members dying. If attacking tankers with submarines were used as a tool to dissuade or prevent a conventional or nuclear war with China, it is certain that policymakers would be willing to accept the environmental costs.

There are legal implications in attacking civilian merchant ships. Current U.S. interpretation of the London Protocol of 1936 and customary practice observed by states during WWII does allow submarines to attack and destroy enemy merchant vessels. This can

⁵⁶ American Petroleum Institute, *Tankers: Fueling American Life*.

⁵⁷ J. W. Readman, et al., “Recovery of the Coastal Marine Environment in the Gulf Following the 1991 War-Related Oil Spills,” *Marine Pollution Bulletin* 32, no. 6 (1996): 493.

⁵⁸ *Ibid.*, 498.

be done without warning or providing for the safety of the crew so long as the “enemy has integrated its merchant shipping into its war-fighting/war-sustaining effort” and warning the vessel prior to attack would “subject the submarine to imminent danger or would otherwise preclude mission accomplishment.”⁵⁹ These guidelines provide a legal basis for U.S. submarines to attack tankers. Legal issues become more complicated in that only 10% of Chinese energy imports are carried on Chinese-flagged vessels.⁶⁰ Geoffrey Till notes that “it is now common for beneficial ownership of merchant hulls to be vested in shifting multinational shipping alliances. With finance extended by one country, the cargo owned by another set of companies, the ship in transit from one state to another and crewed by people from a range of other countries.”⁶¹ This presents a much more difficult legal problem than was faced in WWII but does not make the legal challenges insurmountable. As Milan Vego reasons the “pattern of maritime trade would change drastically once the hostilities at sea began”⁶² thereby making a situation where neutral and friendly tankers would stop shipping oil to China a realistic scenario. This would resolve much of the legal complexities that exist in today’s globalized world and make the modern model look more like the WWII model.

Contemporary thinkers such as Geoffrey Till suggest that trade warfare as a whole is unlikely in today’s interconnected and globalized economy since an attack on one part of the global network would also impact the attacker.⁶³ On this topic, Milan Vego points out that “No one can possibly envisage that one’s ships would carry cargo to ports controlled by the enemy. Hence, possible losses for the attacker would be contained only in the war’s initial

⁵⁹ U.S. Department of the Navy, *Commander’s Handbook*, 8-13.

⁶⁰ Collins and Murray, “No Oil,” 84.

⁶¹ Till, “A Changing Focus,” 12.

⁶² Milan Vego, “Maritime Trade Warfare,” Naval War College, July 2015, 49.

⁶³ Till, “A Changing Focus,” 14.

phase.”⁶⁴ Another contemporary argument states that the value of goods actually transported over the sea are less vital to a state’s economy since currency is actually transferred from market to market electronically.⁶⁵ While this is probably true in the complete sense of attempting to use trade warfare to strangle an economy, this argument applies less to the specific case of targeting Chinese oil imports as the target is cutting the supply of the commodity itself. Since oil cannot be transferred electronically over the web, and planes, ships, and tanks still run largely on gasoline, oil imports remain a real tangible link whose disruption would be felt. As with the environmental and legal arguments against attacking tankers, the economic concerns would likely not tip the scale against conducting trade warfare given the other cost-effective benefits.

There are some tactical challenges that would need to be overcome in order for the U.S. Submarine Force to conduct a trade warfare campaign against Chinese oil imports. The Strait of Malacca is shallow and highly congested, thereby making it not the most suitable area for nuclear submarines to operate. There are, however, deeper areas particularly on the western approaches to the strait where submarines could operate without issue. Based on the nuclear-powered endurance and stealth of a U.S. submarine, accessing these areas would be easily achievable. Congestion around the tankers to be targeted could cause an issue for submarines in limiting collateral damage by inadvertently striking unintended targets. This could possibly be mitigated through declaration of a maritime exclusion zone, keeping neutral and friendly shipping out of the area. However since the Strait of Malacca is critical for global shipping and not just Chinese oil imports, this tactic would have the negative consequence of impacting shipping bound for friendly states. Ultimately, though, these

⁶⁴ Vego, “Maritime Trade Warfare,” 49.

⁶⁵ Till, “A Changing Focus,” 11-12.

tactical challenges are surmountable and would not stand in the way of a submarine campaign aimed at impacting Chinese oil imports.

Conclusions

Investigation shows that attacking Chinese oil imports using submarines would be extremely effective and that the U.S. would enjoy an asymmetric advantage in the sense of resources expended. China's domestic oil resources and pipeline infrastructure are not capable of fueling its energy needs, making China rely on maritime imports. China is dependent on SLOCs through the Indian Ocean, Strait of Malacca, and South China Sea to import oil from the Middle East and Africa. These SLOCs are susceptible to blockade or attack through a variety of means. While a blockade by surface units could be impacted by Chinese surface and anti-access capabilities, there is little the PLAN could do to counter a U.S. submarine campaign against its oil SLOCs. China is aware of its vulnerability and is taking steps at mitigating it. Establishing artificial islands, making excessive territorial claims of the South China Sea, building new oil pipelines and canals, and establishing overseas bases can all be seen as Chinese efforts to reduce their vulnerability to a U.S. attack on their oil SLOCs.

There would certainly be costs associated with attacking tankers. Environmental costs can be somewhat defined and there are recent examples that could be applied to understand the impacts. Economic costs of disrupting the global economy would be felt by the U.S., but likely these types of costs would exist under any circumstances if the U.S. were in a major conflict with China. Diplomatic and political costs are somewhat more nebulous and would present policymakers with a challenge. Ultimately, though, as with unmanned aerial vehicles and Special Operations Forces, the asymmetric power projection and low cost and risk of

using submarines to target oil imports would likely win over U.S. planners and policymakers. This type of operation would certainly sell better to a domestic U.S. audience than full-scale combat operations with the associated casualties and financial costs.

While investigation shows that submarines could be effective any time, it is true that policymakers would likely only accept the diplomatic risk of attacking civilian tankers during a time of major conflict. It may also be true that policymakers would seek to use such a campaign in order to dissuade escalation to nuclear war or a major conventional war such as the forcible reunification of Taiwan via a cross-strait invasion. If U.S. national strategic leadership sought to decide how best to target China, they would be wise to note that historical examples of maritime trade warfare stretch back thousands of years. Rather than fall victim to the thinking that the next war will be different than the last as General Bradley did in 1949, they should consider maritime trade warfare as an enduring nature of war, and the submarine as the most capable platform to execute it today.

Recommendations: Factors in Maintaining the U.S. Advantage

Vulnerabilities in Chinese oil imports today do not in any way guarantee that the same vulnerability will exist in 2050. China is taking steps to secure additional domestic sources of oil, diversify transport options by building pipelines and canals, and defend SLOCs through overseas basing and improved ASW proficiency. If China succeeds in these areas, as they are likely to do eventually, the advantage that the U.S. holds in the ability to choke Chinese oil supply may be at risk.

U.S. intelligence and economic analysts should monitor for developments in the Chinese oil economy to understand if China remains dependent on oil imports. Likewise, they should track import sources to determine if imports remain dependent on seaborne

transport and through what areas and chokepoints they transit. This will allow U.S. Navy planners to develop plans to cut SLOCs if directed. Chinese overseas basing and ASW proficiency should be monitored. If the PLAN develops the logistical reach to defend SLOCs far from the PRC mainland, and if these forces develop into a credible ASW threat, the U.S. could lose some of the asymmetric advantage that would be enjoyed today.

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